Student Assessment: Comparing Laboratory Programs

The first assessment compared student opinions of the ESA21 activities to those of the previously utilized laboratory exercises. After the conversion of the Interdisciplinary Science courses to an environmental theme but before the use of the ESA21 exercises, the laboratory program for the course consisted of a series of on-campus activities examining basic principles in biology, physics, and chemistry. The exercises were a holdover from the course's previous focus on multidisciplinary science, and they were modified (introductory material and questions added) for better relevance to the new environmental focus. As such, they were similar to many of the collections of conventional laboratory exercises in Environmental Science. An assessment instrument consisting of eight questions was given to 140 students who had completed the old laboratory program (semester before switch to ESA21 exercises) and 208 students who had completed the new laboratory program (first semester using ESA21 exercises). By comparing the student responses with the old laboratory program to the ESA21 exercises, we found that students felt convincingly that the ESA21 exercises were indeed more relevant to the course and the real world than the conventional exercises. The data is shown below, with the questions that showed a significant difference in results listed in bold. When asked to identify any lifestyle changes they would embrace as a result of their experiences in the laboratory, students who completed the ESA21 exercises listed specific activities such as insulating their homes, changing thermostat setting, or starting to carpool. Responses to the same question from students who completed the old exercises generally stressed increased environmental awareness but lacked specific lifestyle changes.

Question	Answers	Before	After
1. The instructions for these laboratories were clearly written	Agree/Strongly	64%	66%
	Neutral	19%	15%
	Disagree/Strongly	16%	18%
2. The laboratories were challenging, but presented an appropriate level of difficulty for non-science majors.	Agree/Strongly	77%	69%
	Neutral	14%	18%
	Disagree/Strongly	9%	12%
3. The laboratory exercises were about issues that affect me.	**Agree/Strongly**	**26%**	**60%**
	Neutral	**36%**	**20%**
	Disagree/Strongly	**37%**	**20%**
4. The laboratory program helped me to understand the environmental issues.	**Agree/Strongly**	**50%**	**68%**
	Neutral	**30%**	**21%**
	Disagree/Strongly	**20%**	**10%**
5. Completing the laboratories helped me to develop a better understanding of how science is done.	Agree/Strongly	66%	57%
	Neutral	22%	28%
	Disagree/Strongly	12%	15%
6. The laboratory activities were interesting.	Agree/Strongly	46%	41%
	Neutral	27%	37%
	Disagree/Strongly	27%	22%
7. The laboratory program made me realize that I have a part in solving environmental problems.	**Agree/Strongly**	**43%**	**58%**
	Neutral	**29%**	**28%**
	Disagree/Strongly	**28%**	**14%**
8. Participating in this laboratory program caused me to change the way I do some things.	**Agree/Strongly**	**17%**	**29%**
	Neutral	**31%**	**39%**
	Disagree/Strongly	**52%**	**32%**